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regard the typical cellular structure as a derived and somewhat degenerating process. Regarding the nucleus as central, both structurally and functionally, the nascent endoplasm immediately surrounding the nucleus is derived from the nucleus which has manufactured it from the food taken in by the cytoplasm. The nascent endoplasm is gradually transformed into the outer maturer endoplasm, and this gives rise in turn to the ectoplasm. The functions are less and less active, passing from nucleus to ectoplasm. The authors therefore look upon the early embryo as a differentiating plasmodium. They claim to have traced this condition into the three-layered stage in vertebrate embryos.

#### FACTORS CONTROLLING THE RATE OF REGENERATION

Zeleny (Ill. Biol. Monog., Aug. 1916) continues his studies on regeneration and the factors, internal and external, that may influence it. In this monograph of 170 pages the author investigates the following points upon amphibian larvæ:—

1. Rate of regeneration from new tissue compared with that from old tissue. The general conclusion is that the rate of regeneration is independent of the age of the cells near the cut surface, except in those early stages where cell migration rather than cell division secures the regeneration, in which case the rate of regeneration may be greater from new tissue.

2. Rate of regeneration as determined by successive removal. The rate of successive regeneration is found to decrease with successive removals in the same individual. The factor of age of course enters into such a case. By eliminating the age factor the investigator found that there is no decrease in rate for the second and third regenerations. Indeed the second has an advantage over the first, and the third somewhat less over the second.

3. The effect of the level of the cut on the rate and completeness of regeneration. In general it was found that the rate of regeneration varies directly with the amount of material cut away,—the deeper the cut the more the regeneration both in rate and amount. But in any event the regeneration stops short of complete replacement.

4. Effects of degree of injury. Within reasonable limits regeneration of a part is not retarded by the simultaneous removal of other and different parts. The removal of similar parts may even accelerate the regeneration; e. g., the right foreleg regenerates more rapidly when the other foreleg is also removed than when the right alone is removed.

The author finds that the rate of regeneration varies,—starting slowly, increasing rapidly until near its maximum, then decreases rapidly, and finally decreases slowly to zero. The forces that cause the cessation of regeneration seem to stop the process short of complete regeneration.

#### THE HEAD AND MOUTH PARTS OF DIPTERA

Peterson (Ill. Biol. Monog. III:2, Oct. 1916) presents the results of a study of 53 of the 59 families of North American Diptera. Twenty-five plates with more than 600 figures accompany the monograph.

The plan consists in constructing a "hypothetical type" for the head capsule and each of the mouth parts, with which to compare the particular forms. This hypothetical type is formed by consideration of the parts of generalized groups of insects and of the less specialized conditions in the Diptera themselves. All the different parts are brought into comparison with this hypothetical type as well as with one another.

Modification of the fixed and movable parts from this generalized type usually take the form of reduction, change of shape, loss of chitinization, or expansion of the membranous areas.

The results are too technical and of too much detail to report in brief space and apart from the figures. While the mouth parts show wide modifications in the order, all of them, including the epipharynx and the hypopharynx, retain their relative position,—although they are sometimes extruded a considerable distance from the head capsule.

The compound eyes are unusually well developed. They show secondary sexual characters in a larger number of species than do any other of the head parts.